RI Environmental Monitoring Collaborative (RIEMC): Winter Meeting
Narragansett Bay Commission, Boardroom
Meeting Minutes and Notes
January 14, 2016

Members Present: Nicole Rohr, Tom Uva, Kathy Crawley, Linda Green, Tom Kutcher, Chuck LaBash, Matt Ladewig, David Murray, Amie Parris, Bob Stankelis

Attendees: Terri Breeden, Christine Comeau, Katie DeGoosh, Nancy Hess, Jim Kelly, Eliza Moore, John Motta, Ernie Panciera, Margarita Pryor, Pamela Reitsma

Nicole Rohr opened the meeting by welcoming the EMC participants and thanking them for their participation. She initiated a round of introductions followed by introduction of an invited presentation by Nancy Hess (RI DOA) and Ernie Panciera (RIDEM) on the status of the Water Quality Management Plan.

Water Quality Management Plan
Water Quality 2035: Rhode Island Water Quality Management Plan is a new guide plan to consolidate other four outdated policies into one plan. The goal is to cross-reference and reinforce polices and actions already reflected in other plans, such as Land Use 2015, Water 2030, Transportation 2035, and to include other planning efforts, such as the Comprehensive Conservation Management Plan and the Bays, Rivers, and Watersheds Coordination Team Systems Plan.

Hess and Panciera walked through the draft plan and provided an overview of vision and goals, layout and organization, and current content and information gaps. The key management principle most relevant to the RIEMC is that monitoring is essential to provide information for effective management. Emphasis was given to the following sections and RIEMC members were asked to provide feedback:

- Part 4: Water Quality Monitoring and Assessment – review for accuracy and completeness, and provide content edits to Nancy Hess.
- Implementation Matrix - Policies and Actions – review the monitoring and assessment policies at the end of Part 6; please fill in if your organization can serve as lead or support for any of the actions.
- Full report – please feel free to review the entire document (http://www.planning.ri.gov/documents/water/notes15.pdf) and provide edits and suggestions to Nancy Hess; note that formatting is not set so do not spend time commenting on margin size, minor typos, alignment issues, etc.

A PDF of the presentation is included at the end of the minutes and includes contact information for questions/suggestions regarding the WQMP.

RIEMC members were given the opportunity to provide immediate feedback on over-arching content and concepts:

- Tom Kutcher suggested incorporating the new salt marsh monitoring and assessment plan that will be run under CRMC. Margarita Pryor asked if that would be discussed under the section on aquatic habitat, and Ernie Panciera seemed to think so but the monitoring and assessment portion could be reflected in the Part 4 actions as well.
- General discussion on how to fill priority gaps, identifying appropriate IT systems, minimizing state program capacity gaps, and securing sustainable infrastructure financing.
- Margarita Pryor added that she believes RIDEM is planning to host the water based plans on their website and the monitoring data will be critical; Ernie Panciera confirmed there will eventually be a watershed plan for each of the watershed areas, but in the interim, there will be a webpage for each of the monitoring areas with some basic information.
- Tom Kutcher asked for more information on how well the water basins align with the rotating basins assessment.
- Linda Green asked if this is in line with the TMDL planning and assessment process; Ernie Panciera replied that the hope is for the TMDL process to be completed and then the water quality management plan can be overlaid on it.

2015 Monitoring Results/Overviews

Following the presentation, the meeting continued with updates on the 2015 monitoring efforts by RIEMC members.

Christine Comeau reported on behalf of Tom Uva and the Narragansett Bay Commission. This is the second year with seasonal total nitrogen permit limits of 5 mg/L. Both Field's Point and Bucklin Point remained in compliance, with seasonal total nitrogen averages of 4.18 mg/L and 4.26 mg/L, respectively. This equated to a 78% reduction in loading when compared to 2003, and NBC estimates that the total nitrogen loading has gone down 50% from the 2006-2013 average. NBC continues to monitor dissolved inorganic nitrogen (DIN) at seven stations and three were in the good category (< 0.1 mg/L), two were in the fair category (0.1-0.5 mg/L), and two were in the poor category (> 0.5 mg/L) based on National Coastal Conditions Report category thresholds.

NBC conducts fixed-site monitoring at three sites and provided information to RIDEM regarding the four 2015 fish kill events, most of which occurred in the upper reaches of the Seekonk River. NBC developed a fish kill response SOP. NBC is looking into some new water quality measuring instruments as a part of their systems reevaluation process, and plan to upgrade the buoy and water quality instruments at least the Bullock's Reach location. It has also made progress on the benthic video monitoring; the methodology has been completed and quantitative measures are beginning.

A summary of the NBC report is included at the end of the minutes and all NBC fixed-site monitoring data can be found at http://snapshot.narrabay.com/app/Buoys/Export.

David Murray (Brown University) reported on the dissolved oxygen spatial surveys conducted by Brown, the University of Rhode Island, RIDEM, and Save The Bay. They conducted six surveys targeting the end of neap tide cycles on June 30, July 14, July 28, August 12 (moved from original planned day due to weather), August 25, and September 8.

Fish kills (menhaden) were observed in the Seekonk River in June and mid-August, and correlated with low DO in the shallow Seekonk River. There is no consensus on cause, but NBC collected tissue samples that were sent out for analysis to determine if parasites, disease, or low oxygen were factors.

Other qualitative observations included the presence of lots of baitfish and schools of Blues at the end of August and beginning of September. Also, unlike other years, they did not see many jellyfish or ctenophores.

Brown received funding from NEIWPCC/NBEP to process, compile, and display 2014 and 2015 data, and to add it to the compilation of 2005-2013 data. That effort is currently underway.

Tom Kutcher (Save The Bay) expanded upon David Murray's comments but adding that STB did notice that the dead menhaden concentrated in areas of low oxygen, and there were no dead fish in the middle of the bay.

Currently, saltmarsh monitoring is a priority for STB and it is working on a restoration project at Ninigret Pond to use deposition to build up marsh elevations. The goal is to set up full monitoring at Ninigret and a control site, including a full year of pre-monitoring at both sites, which is done. There is also monitoring in the Narrow River where some draining is occurring.

Kenny Raposa (Narragansett Bay Research Reserve), Wenley Ferguson (STB), Tom Kutcher (STB) and others have been working on a salt marsh monitoring plan for the state. The plan is in the revision process and final copies will be provided to RIDEM and CRMC.

STB has a lead on permanent funding from the CRMC dredge fund. This is not 100% finalized yet, but eelgrass data is of the type of data needed to make dredging decisions. This funding would be used to conduct color infrared, peak of the growing season, aerial surveys. The survey images could also be used to tier one salt marsh monitoring as well. Margarita Pryor asked for confirmation that this fund would be separate from the oil fees, and Tom Kutcher confirmed. He also added that the funds would be for eelgrass monitoring, but the resulting data would be a state data set, will go into RIGIS and the RI Digital Atlas, and will be available to others. The surveys will target the coastal region but they do go inland a bit. Flights will likely be sometime between mid-July and the end of September. Margarita Pryor asked if these could capture algal blooms, but the timing may not necessarily align for that.

Chuck LaBash (URI Environmental Data Center) reported that the EDC is also involved in the above-described eelgrass project. In addition, sea level rise inundation services will be

posted through Digital Atlas/RIGIS in the next couple of months, which the EDC is working closely on with CRMC and other partners. EDC continues to work closely with statewide planning to service the RIGIS data and are also adding more content to the Digital Atlas on a regular basis.

Kathy Crawley (RI Water Resources Board) reported on the WRB's monitoring of monthly conditions and responding to droughts, and collecting water withdrawal data from supplier. The WRB monitors monthly precipitation, groundwater levels, and Palmer drought index, and all of the data can be found at http://www.wrb.ri.gov/data.html. The website also includes links to streamflow and groundwater data.

Rhode Island set nine new monthly minimum flow records in 2015 and six in 2015, some of which were for multiple months (a water year is October 1 through September 30). The Pawcatucket-Wood River Junction is a nonregulated gage used to create periods of records to compare with other areas in the state. Record lows were set at this gage in September and October 2014, May 2015, and September 2015. These do not equate to the beginning of long-term droughts, but they are very dry periods.

The WRB collects water withdrawal data from the water suppliers once a year, and there is an effort to compile that data for the watershed with the goal of gaining insight to how water use and withdrawal impacts watersheds, and how changing precipitation patterns impact water infrastructure plans. One trend is that recent dry conditions are exacerbated by increased human water use when it is dry.

The WRB has started to look at new water supply solutions in areas that are reliant on groundwater, for example, capture and storage. David Vallee at USGS has looked at 40 year time periods of data and has some interesting results as far as average annual precipitation and intensity per event. Other state agencies are looking at what this might means for longer agriculture growing seasons and increased evapotranspiration. Tom Kutcher added that there are several academic papers that look at critical tipping points where the average does not change but the variation among the mean can drastically change; you could speculate that with climate change you are seeing this kind of change.

Linda Green (URI Watershed Watch) added to Kathy Crawley's comments that the Kingston weather station has some great data including daily measurements for close to 120 years, which is managed by Carl Sawyer.

Watershed Watch did winter monitoring on Buckeye Brook with the Buckeye Brook Association, focusing on glycol and other winter parameters. During the 2014-2015 winter, RI received 76 inches of snow and there was a noticeable decrease in glycol in the stream, with the highest concentration about 50 ppm. The RI airport association funds this monitoring and has invested about $33 million in glycol containment and habitat restoration.

In Warwick Pond, there is a large increase in *Phragmites* growth and there is concern that this is blocking flow; the first ever cyanobacteria alert was issued for Warwick Pond but

none of the samples tested as toxic. Watershed Watch is working with EPA Region 1 on the cyanobacteria bloom watch program to conduct more intense monitoring in lakes and ponds. It is comparing new methodology to regular chlorophyll monitoring with volunteers.

In general, Watershed Watch volunteers also report qualitative data on dry/low water streams, and monitoring activities are shifting toward more coastal/saltwater locations.

Amie Parris reported that the RI Department of Health conducted saltwater beach monitoring, and collected an extra 300 samples to duplicate samples at all locations that only have one sample point for quality assurance. In 2015, the exceedance rate was 11.5%, which is higher than 8.8% in 2014; however, 2015 was the first year for the new standards required by EPA. When the 2015 data were compared against the previous standard, then the exceedance rate stayed approximately the same.

Closure events increased from 34 to 39 despite doubling the amount of precipitation. There were three events that exceeded 10,000 cfu (two at Atlantic Beach Club and one at Goddard State Park), which are concerning. When the data were broke down by town, the numbers are fairly consistent with last year. This year, there was a large increase in closure days at Peabody's Beach in Middletown, but that was not necessarily due to high bacteria levels; there was a drinking water contamination and the city was trying to find the source so they temporarily closed the beach.

Warwick continues to be a problem and is closed over 40% of the time. There was a large increase in closure days/events at urban beaches this year, which may be a function of more precipitation and more impervious cover.

Funding for beach monitoring has been secured for the 2016 summer from the EPA Beach Program, but is uncertain after that.

David Murray asked if RIDOH is planning to start qPCR analysis. Amie Parris reported that RIDOH is beginning that process. It received an EPA SNEP grant to evaluate and validate the RIDEM protocols using an Enterococci test method from EPA. This will be a three to four hour test and the state lab is purchasing equipment and receiving training. From now until October 2017, RIDOH will be doing site-specific validation at volunteer sites including Bristol and Warwick. It hopes to eventually do validation at all sites and use that validation value in future standards development. He also added that Brown as access to a qPCR analytic instrument and a small budget, so it could eventually provide a partnership for education.

Tom Uva asked how the cost per sample with the qPCR analysis compared to the current method. Amie Parries said that they have not crunched those numbers but the instrumentation cost $100,000 so the EPA grant to purchase it was critical that that cost does not have to be factored in to future cost per sample.

A summary table of the RIDEM saltwater beach monitoring results can be found at the end of the minutes.

Katie DeGoosh from RIDEM reported on freshwater quality. RIDEM continued the rotating basin monitoring in the greater Pawcatuck area. It conducted ambient river monitoring at 63 monthly stations for pathogens and nutrients. It also conducted biomonitoring of stream macroinvertebrates at 32 stations, which was the first time doing this in-house. RIDEM monitored 17 sites to develop numeric nutrient criteria using chlorophyll and diatoms. Twenty-two lakes and rivers were monitored for aquatic invasive plants; many of them were revisits with no new species of location.

Matt Ladewig commented that RIEMC has been reporting for years that it is becoming harder and harder to secure full funding for streamflow monitoring. He worked on a pilot project using pressure transducers to monitor pressure in stream every five minutes. The methodology worked pretty well, not as good as USGS, but is curious if there is a use for this technique to supplement the USGS stream gages given the low cost. Kathy Crawley mentioned that USGS has done similar supplement monitoring projects for groundwater in other places, and incorporating it into streamflow is an intriguing idea; we could certainly use data from additional locations. For example, Brushy Brook and Moscow Brook are small tributaries that are not close to a stream gage. Matt Ladewig added that it would be beneficial to set up a transducer in conjunction with a USGS stream gage for quality assurance. Please be in contact with Matt Ladewig if you are interested in exploring this option.

Bob Stankelis of the Narragansett Bay Research Reserve reported that the salt marsh monitoring efforts have already been discussed by other partners. NBNERR continues to monitor the long-term sites on Prudence, with the tier 3 sites being the most data intensive. It is looking for funding to extend the protocol to create a monitoring gradient throughout the bay. Water quality monitoring at the fixed-sites continues, and they are switching over to the XO Sondes. NBNERR remains involved in a host of smaller projects, including the impacts of crabs on intertidal areas, and they always look for funding to do additional projects.

Margarita Pryor of EPA reminded everyone that there is an RFP that closes next Friday so check out the EPA website and consider submitting a proposal.

<u>RIEMC Website</u>

Nicole Rohr provided an overview of how she envisions the new RIEMC website coming together and asked all members to think about the elements they would like to see incorporated. She will be meeting with members one-on-one as the website is being developed to write content and ensure accuracy. In the meantime, please make an extra effort to take photos of your monitoring, preferably with people included, that can be used on the future website.

Tom Uva said this is a great opportunity to restructure when we submit the report to the governor and the General Assembly so that it is more beneficial as they develop and

approve the state budget. He said that ideally we would get the report to them in September/October because the governor typically releases her budget to the General Assembly in the 3rd week of January. Then, if we want to follow up with the General Assembly regarding the monitoring priorities, we could do that in the winter.

2015 Annual Report

Nicole Rohr added that the website will not be complete before the next annual report so RIEMC will need to compile one more paper version. She envisions this being a pared down version with focus on the development of the website. Please be on the lookout for a monitoring survey from Terri Breeden in the coming weeks.

MEETING ADJOURNED

Narragansett Bay Commission – 2015 Monitoring Season Update

Environmental Monitoring Collaborative Meeting, January 14th, 2016

Nitrogen Loading to Upper Narragansett Bay

- Both Bucklin Point and Field's Point remained in compliance with seasonal total nitrogen permit limits (5 mg/L) throughout 2015.
- Overall average TN for the season:
  - Field's Point – 4.18 mg/L
  - Bucklin Point – 4.26 mg/L
  - 78% reduction in loading compared to 2003
- Table at right compares N loading from *all sources* to upper Bay pre- (2006 - 2013) and post-nitrogen treatment upgrades (2014 - present) at NBC facilities. Overall loadings are down 49% compared to the pre-upgrade period.

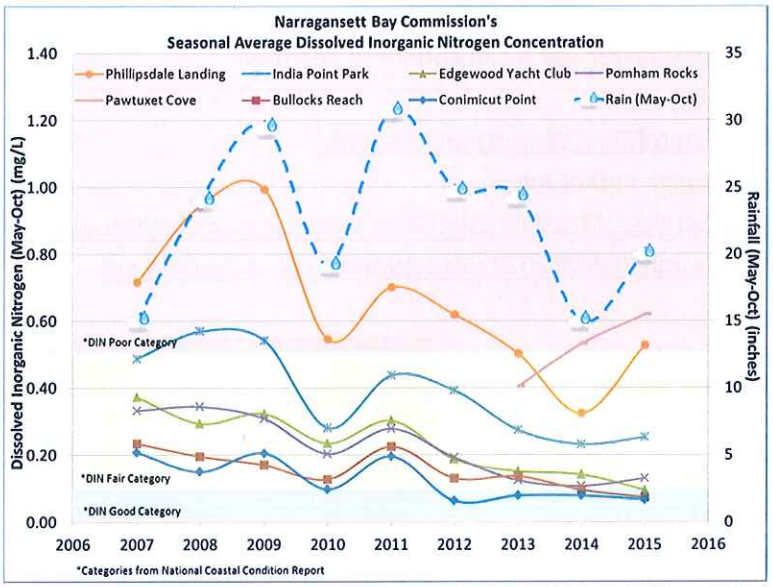
	2006 - 2013 Average	% of Total Loading	2014 - 2015 Average	% of Total Loading
	lbs/day	%	lbs/day	%
Bucklin Point	1,184	5.8%	596	5.7%
Field's Point	3,985	19.5%	1,219	11.7%
Blackstone River*	4,426	21.7%	1,726	16.6%
Moshassuck River*	174	0.9%	116	1.1%
Woonasquatucket River*	425	2.1%	113	1.1%
Pawtuxet River*	2,156	10.5%	1,173	11.3%
Ten Mile River*	812	4.0%	141	1.4%
East Providence WWTP**	517	2.5%	265	2.5%
Taunton River*	2,692	13.2%	1,058	10.2%
Fall River WWTP	3,227	15.8%	2,993	28.7%
Other Sources TOTAL***	844	4.1%	1,010	9.7%
Total Contribution	20,442		10,411	

*River data is Total Dissolved Nitrogen only

**Data for this plant for October 2015 is not yet available.

***"Other Sources" includes the East Greenwich, Bristol, and Warren WWTP. October 2015 data not yet available for these plants.

Dissolved Inorganic Nitrogen in Upper Narragansett Bay



National Coastal Conditions Report:

Poor: >0.5 mg/L

Fair: 0.1 – 0.5 mg/L

Good: <0.1 mg/L

DIN concentration (mg/L)	2014	2015
Conimicut Point	0.078	0.07
Bullock's Reach	0.095	0.07
Edgewood Yacht Club	0.14	0.09
Pomham Rocks	0.11	0.13
India Point Park	0.23	0.25
Phillipsdale Landing	0.32	0.53
Pawtuxet Cove	0.53	0.62
RAIN (May - Oct)	*14.94*	*20.1*

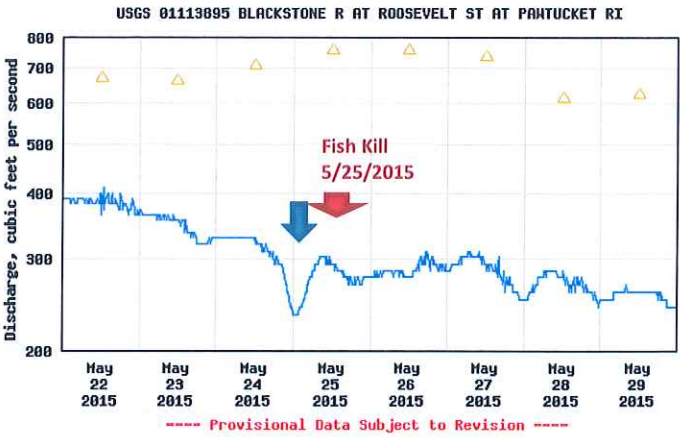
- 3 stations in "good category".
- Phillipsdale increased after 3 years of decline.
- Pawtuxet Cove increasing, highest of all sampled locations.
- For data: http://snapshot.narrabay.com/app/WaterQualityInitiatives/NutrientMonitoring

Fixed-Site Monitoring

- Phillipsdale bottom – Fair DO, 18% of time was hypoxic (May – October).
- Edgewood Yacht Club bottom – Poor DO, 47% of time was hypoxic (May – October).
- Bullock's Reach bottom – Good DO, 0.13% hypoxic conditions at the bottom (June – October).
    - Bottom DO data is missing from 8/25 – 9/9 due to sonde failure
- For data: http://snapshot.narrabay.com/app/Buoys/Export

2015 Fish Kills

- NBC conducted special sampling (Seabird casts, plankton tows, fish collection) and evaluated fixed-site data – provided data to DEM to support their investigations into four fish kill events from May to September, mainly in the upper reaches of the Seekonk River.
- Adult Atlantic menhaden almost exclusively affected - "Whirling", surface spinning behavior observed.
- NBC developed a fish kill response SOP for future events.



- Hypoxia investigated as a contributing factor, not clear-cut as the direct cause.
- Low freshwater flows from the Blackstone, including sporadic drops (see chart), being considered as contributing factors, as well as "whirling disease" as suggested by CT DEEP, and "cornering" of abundant menhaden in upper reaches of Seekonk River.
- Freshwater plankton blooms from upstream also being considered – do the phytoplankton persist in low-salinity surface water past Slater Dam? Contribute to detritus?
- For a report on the May 2015 fish kill: http://snapshot.narrabay.com/app/LearnMore/WaterQualityReports
- Presentation on NBC fish kill data through end of July: http://snapshot.narrabay.com/app/Services/MossFile.ashx?file=/s/emda/snapshot/Documents/Publications/PowerPoint%20Presentations/NBC%202015%20Workshop/Fish%20Kill.pdf

Benthic Video Monitoring

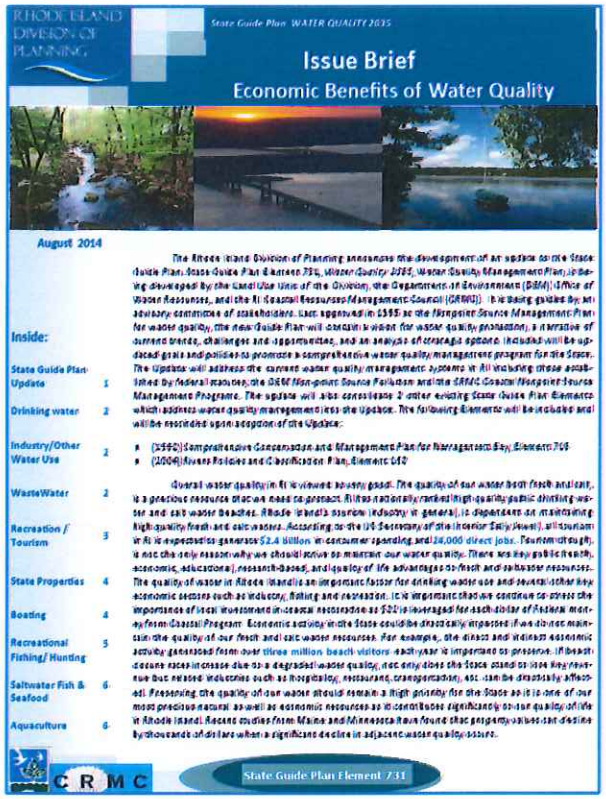
- Began in earnest in late 2014, methods ironed out/improved throughout 2015.
- Late 2015 and into 2016, conducting quantitative data analyses to allow future time-series comparisons of species abundances and habitat change.
- Visibility problems during the summer, fall and winter surveys more successful. Conditions good enough to allow filming in the shipping channel in December, typically too low-light during most of the year. Bottom in the channel was unstructured, as expected, with few mobile organisms observed.
- http://snapshot.narrabay.com/app/WaterQualityInitiatives/BenthicVideoMonitoring

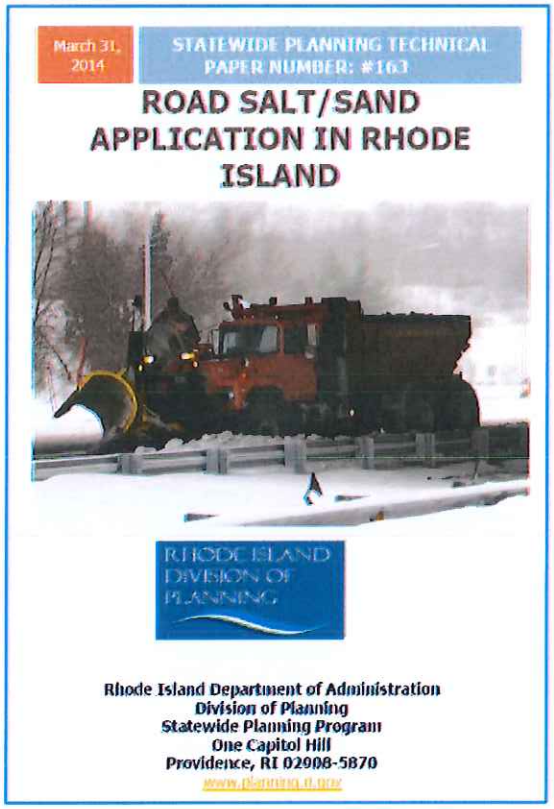
RIDOH Coastal Beach Summary	2015	2014
Number of Saltwater Samples Collected	2025	1747
Number of Saltwater Beaches Sampled	69	69
Number of Saltwater Beach Sample Satations	133	133
Number of Samples exceeding 60 cfu/100ml	234	154
Exceedance Rate: 60 cfu/100ml	11.55%	8.81%
Exceedance Rate: 104 cfu/100ml (historical value)	6.57%	6.18%
Rainfall Total (Memorial Day - Labor Day)	13.65"	6.80"
Significant Rain Events (>0.5" in 24-hr)	8	7
Closure Events	39	34
Closure Days	54	48
	2015	2014
Number of Samples between 60-100 cfu/100ml	89	46
Number of Samples between 100-500 cfu/100ml	115	82
Number of Samples between 500-1000 cfu/100ml	16	5
Number of Samples between 1000-5000 cfu/100ml	9	3
Number of Samples between 5000-10000 cfu/100ml	2	2
Number of Samples >10,000 cfu/100ml	3	0
	2015	2014
% of Saltwater Closure Days: Bristol	1.9%	2.1%
% of Saltwater Closure Days: Middletown	25.9%	12.5%
% of Saltwater Closure Days: Narragansett	3.7%	6.3%
% of Saltwater Closure Days: Newport	11.1%	16.7%
% of Saltwater Closure Days: North Kingstown	5.6%	2.1%
% of Saltwater Closure Days: Warren	7.4%	8.3%
% of Saltwater Closure Days: Warwick	44.4%	41.7%
	2015	2014
Urban Beach Sample Exceedance Rate: Bold Point	33%	13%
Urban Beach Sample Exceedance Rate: Field's Point	0%	8%
Urban Beach Sample Exceedance Rate: Rose Larissa	31%	12%
Urban Beach Sample Exceedance Rate: Sabin's Point	29%	21%

State Guide Plan Update:
Water Quality Management Plan

The Land Use Unit is working with the Department of Environmental Management (DEM) and the Coastal Resources Management Council (CRMC) in updating State Guide Plan 731, Nonpoint Source Pollution Management Plan and creating a Rhode Island Water Quality Management Plan as a new / updated element of the State Guide Plan. Working with an advisory Committee two background reports has been completed to date. To see more details on the project or either report look on line at:

http://www.planning.ri.gov/statewideplanning/land/water.php





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